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BATTAGLIA, MICHAEL V	
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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/616,364	UCHIYAMA, MINEHARU	
	Examiner	Art Unit	
	Michael V Battaglia	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on *29 December 2003*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-13,15 and 18-33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *27-32* is/are allowed.

6)☐ Claim(s) *1-13,15,18-21,24-26 and 33* is/are rejected.

7)☐ Claim(s) *22 and 23* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *13 July 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 9.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

This action, dated March 19, 2004, is in response to the Applicant's amendment, filed December 29, 2003. Claims 1-13, 15, and 18-33 are pending.

Specification

1. The disclosure is objected to because of the following informality. On line 8 of page 18, the examiner suggests replacing "FIG. 2B." with -FIG. 4B.- Appropriate correction is required.

Claim Objections

2. Claims 22-23 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. A dependent claim shall not conceivably be infringed by anything which would not also infringe the base claim. The base claim 21 recites the limitation that the center of the hologram is aligned with the midpoint between the optical axis of the first light source and that of the second light source in projection on said hologram. In claims 22 and 23, the center of the hologram is no longer aligned with the midpoint between the optical axes of the first and second light sources. In claim 22, the center of the hologram is almost aligned with the midpoint between the optical axes of the first and second light sources. Claim 22 is infringed by a hologram with center that is slightly short of being aligned with the midpoint between the optical axes of the first and second light sources that does not also infringe claim 21. In

claim 23, the center of the hologram is aligned so that the center of the hologram is almost closer to the optical axis of the first light source than to the optical axis of the second light source. Claim 23 is infringed by a hologram with a center that is aligned slightly closer to the optical axis of the second light source than to the optical axis of the first light source that does not also infringe claim 21. Therefor, claims 22 and 23 are improperly dependent and will otherwise be withdrawn from further consideration.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1 and 4 are rejected under 35 U.S.C. 102(e) as being anticipated by Toyoda (JP 11-185282). The examiner notes that the citations of the detailed description of Toyoda reference the translation provided by the Japanese Patent Office web site.

In regard to claim 1, Toyoda discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 2, element 21b); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 2, element 21a); a single block wherein the first and the second light source are aligned thereon (Fig. 2, element 21); an objective lens for causing the light beams from said first light source and second light source to converge on an optical disc

(Fig. 2, element 24); and a diffraction grating which is provided on the optical path between said first light source and the objective lens and on the optical path between said second light source and the objective lens and which has a first-order diffraction efficiency of almost zero for the light beam forwarded from said first light source and emits the first-order diffraction light for the light beam forwarded from said second light source (Fig. 2, element 22 and Page 4, lines 17-21), wherein the diffraction grating does not diffract returned light from the recording medium (Page 4, line 50-Page 5, line 23).

In regard to claim 4, Toyoda discloses that two of the first-order diffraction light from said second light source are projected onto tracks, respectively, and used to sense a tracking error signal (Page 4, line 50-Page 5, line 9).

4. Claims 10-11 are rejected under 35 U.S.C. 102(e) as being anticipated by Shih et al (hereafter Shih) (US 6,211,511).

In regard to claim 10, Shih discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 6, element 610a); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 6, element 610b); a single block wherein the first and the second light source are aligned thereon (Fig. 6, element 612); a recording medium having tracks (Fig. 2, elements 260a and 260b); an objective lens for causing the light beams from said first light source and second light source to converge on the recording medium (Fig. 2, element 250); a photodetector for detecting a signal by using returned light from the recording medium (Fig. 6, element 530); and a nonpolarization hologram which is provided between said single block and said objective lens, and projects a light beam onto the recording medium and directs the reflected light from the recording medium to the photodetector (Fig. 6,

element 620). The examiner interprets the hologram as a nonpolarization hologram because no mention is made to polarity, polarization, or polarizing in the reference. The examiner notes that light beams passing through polarization holograms act on light beams passing through the hologram based on the polarity of the light beams and that no mention is made to polarity, polarization, or polarizing in the reference. Therefor, the examiner interprets the hologram as a nonpolarization hologram because if it were not, information would be provided as to the polarity of the light beams, a polarizing element or effect, or to a polarization hologram.

In regard to claim 11, the hologram of Shih has an asymmetrical grating (Fig. 6, element 620).

5. Claims 18-19 are rejected under 35 U.S.C. 102(e) as being anticipated by Kouno (US 6,404,709).

In regard to claim 18, Kuono discloses an optical head device comprising; a first light source for emitting a light beam of a first wavelength (Fig. 1, element LD1); a second light source which emits a second wavelength differing from said first light wavelength (Fig. 1, element LD2); a single block wherein the first and the second light source are aligned thereon (Fig. 1, element 102); a recording medium having tracks (Fig. 1, element 5); and an objective lens for causing the light beams from said first light source and second light source to converge on the recording medium, wherein the position of the optical axis of said objective lens is disposed at least between the optical axes of beams of said first and second light sources, and the optical axis of said objective lens coincides with the optical axis of the beam of light of a shorter wavelength and is disposed nearer to the position of the optical axis of the beam of light of a shorter wavelength than to the beam of longer

wavelength (Fig. 1, element 4 and Col. 4, lines 24-28). The examiner interprets optical axes of the beams of the first and second light sources as the axes on which the beams are emitted from their respective light source.

In regard to claim 19, Kuono discloses that the said recording medium includes a first disk to be read from when said first light source is used and a second disk to be read from when said second light source is used, wherein the substrate thickness of the first disk is thinner than the substrate thickness of the second disk and the distance between the optical axis of first light source and the optical axis of said objective lens is less than the distance between the optical axis of second light source and the optical axis of said objective lens (Col. 4, lines 24-28; Col. 1, lines 36-45; and Fig. 1).

6. Claims 21 and 25-26 are rejected under 35 U.S.C. 102(e) as being anticipated by Kitamura et al (US 5,986,996) (hereafter Kitamura).

In regard to claim 21, Kitamura discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 17, element 3b); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 17, element 3a); a single block wherein the first and second light sources are aligned thereon (Figs. 16 and 17, element 10); an objective lens for causing the laser light from said first or second light source to converge on an optical disk (Fig. 16, element 5); and a hologram for diffracting the light reflected from said optical disk and returned through said objective lens and directing the reflected light to a light-receiving element, wherein the center of said hologram is aligned with the midpoint between the optical axis of said first light source and that of said second light source in projection on said hologram (Fig. 16, element 6).

In regard to claim 25, Kitamura discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 17, element 3b); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 17, element 3a); a single block wherein the first and the second light source are aligned thereon (Figs. 16-17, element 3); an objective lens for causing the laser light from said first or second light source to converge on an optical disk (Fig. 16, element 5); and a hologram for diffracting the light reflected from said optical disk and returned through said objective lens and directing the reflected light to a light-receiving element (Fig. 16, element 6), wherein if the distance between said first light source and said second light source is d, the distance between said first and second light sources and said hologram is in the range from 20d to 40d (Figs. 16-17).

In regard to claim 26, Kitamura discloses that the hologram is a nonpolarization hologram (Figs. 1 and 16, element 6). The examiner interprets the hologram as a nonpolarization hologram because the hologram diffracts the return light based on the gratings of the hologram (shown in Fig. 1) and not on the polarity of the light. The examiner notes that the polarity of the light beams are used by aperture limiting device (Fig. 1, element 9) to control the size of the aperture.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Katsuma (US 6,094,308).

Toyoda discloses an optical head device as claimed in claim 1. Toyoda does not disclose that the diffraction grating has a groove depth h0 expressed by $h0 = m \cdot \lambda 1/(n-1)$ where n is the refractive index of said diffraction grating, $\lambda 1$ is the wavelength of said first light source, and m is a natural number.

Toyoda discloses an optical head device comprising a first and second light source emitting light beams of different wavelength and a diffraction grating, which is provided on the optical path between a first light source (Fig. 6, element 1C) and an objective lens (Fig. 6, element 5) and on the optical path between a second light source (Fig. 6, element 1B) and the objective lens and which has a first-order diffraction efficiency of almost zero for the light beam from one of the said light sources and emits the first-order diffraction light for the light beam from the other said light source (Col. 2, lines 50-54). Katsuma further discloses that the diffraction grating has a groove depth h0 expressed by $h0 = m \cdot \lambda 1/(n-1)$ where n is the refractive index of said diffraction grating, $\lambda 1$ is the wavelength of the light that is not diffracted, and m is a natural number (Col 2, lines 21-41). Katsuma teaches that a diffraction grating with a groove depth meeting the aforementioned expression will efficiently direct light beams of different wavelengths to their corresponding optical media (Col. 1, lines 12-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the groove depth of the diffraction grating of Toyoda meet the diffraction grating groove depth expressed by Katsuma; the motivation being to have a

diffraction grating that efficiently directs light beams of different wavelengths to their corresponding optical media.

8. Claim 3 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Katsuma as applied to claim 2 above, and in further view of Shiono et al (US 6,414,930).

Toyoda in view of Katsuma discloses the optical head device as claimed in claim 2. Toyoda in view of Katsuma does not disclose that the natural number m is 1.

Shiono discloses a diffraction grating that meets the groove depth expression of Katsuma, wherein the natural number m is 1 (Col. 12, lines 61-62). Shiono teaches that with this groove depth, the diffraction grating will have maximum first-order diffraction efficiency (Col. 12, lines 62-64).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the diffraction grating with the groove depth expression of Toyoda in view of Katsuma with m in the expression equal to 1 as suggested by Shiono; the motivation being to have maximum first-order diffraction efficiency.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Nakajima et al (US 5,541,909) (hereafter Nakajima).

Toyoda discloses an optical head device as claimed in claims 1 and 4. Toyoda does not disclose that the said first light source and second light source are a multi-wavelength semiconductor laser array.

Nakajima discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 8, element 21a); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 8,

element 21b); and a single block wherein the first and the second light source are aligned thereon (Fig. 8, element 21). Nakajima further discloses that the first and second light sources are a multi-wavelength semiconductor laser array (Col. 7, lines 51-53) and teaches that providing the two light sources by using a multi-wavelength semiconductor laser array will facilitate simplification of optics and stabilization of the light spot irradiation position (Col. 7, lines 56-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a multi-wavelength semiconductor laser array for the two light sources in the optical head device of Toyoda as suggested by Nakajima; the motivation being to facilitate simplification of optics and stabilization of the light spot irradiation position.

10. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Ohnishi et al (hereafter Ohnishi) (US 6,507,009).

Toyoda discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 2, element 21b); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 2, element 21a); a single block wherein the first and the second light source are aligned thereon (Fig. 2, element 21); an objective lens for causing the light beams from said first light source and second light source to converge on an optical disc (Fig. 2, element 24); and a first diffraction grating which has a first order diffraction efficiency of almost zero for the light beam forwarded from said first light source and emits the first-order diffraction light for the light beam forwarded from said second light source (Fig. 2, element 22 and Page 4, lines 17-21); wherein the first diffraction grating does not diffract returned light from a recording

medium (Fig. 2). Toyoda does not disclose a second diffraction grating which emits the first-order diffraction light for the light beam forwarded from said first light source and has a first-order diffraction efficiency of almost zero for the light beam forwarded from said second light source; wherein the second diffraction grating does not diffract returned light from a recording medium.

Ohnishi discloses a second diffraction grating (Fig. 10, element 2A), which emits the first-order diffraction light for the light beam forwarded from a first light source (Fig. 10, element 1A); wherein the second diffraction grating does not diffract returned light from a recording medium (Fig. 10). Ohnishi further discloses that the second diffraction grating diffracts the light beam forwarded from the first light source to allow use of a differential push-pull method to generate a tracking error signal and teaches that the differential push-pull method is beneficial because it cancels an offset caused by displacement of the objective lens (Col. 2, lines 25-31). Ohnishi does not disclose that the diffraction grating has a first-order diffraction efficiency of almost zero for the light beam forwarded from said second light source.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include, in the optical head device of Toyoda, the second diffraction grating of Ohnishi, the motivation being to facilitate generation of a tracking error signal using the differential push-pull method when using the light beam from the first light source and thereby, cancel an offset caused by displacement of the objective lens. In addition, it would be obvious to one have been obvious to one of ordinary skill in the art at the time the invention was made to make the second diffraction grating of Ohnishi have a first-order diffraction efficiency of almost zero for the light beam forwarded from the

second light source by designing the second diffraction grating as taught by Toyoda wherein a light beam is diffracted while a different light beam passes through unaffected, the motivation being to not affect the light beam forwarded from second light source when the second diffraction grating is added.

11. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Ohnishi as applied to claim 6 above, and further in view of Katsuma.

Toyoda in view of Ohnishi does not disclose the depth h01 of the grating groove of said first diffraction grating is expressed by $h01 = m1 \cdot \lambda 1/(n-1)$ and the depth h02 of the grating groove of said second diffraction grating is expressed by $h02 = m2 \cdot \lambda 2/(n-1)$ where n1 is the refractive index of said first diffraction grating, n2 is the refractive index of said second diffraction grating; $\lambda 1$ is the wavelength of said first light source; $\lambda 2$ is the wavelength of said second light source, and ml and m2 are natural numbers.

Katsuma discloses an optical head device comprising a first and second light source emitting light beams of different wavelength and a diffraction grating, which is provided on the optical path between a first light source (Fig. 6, element 1C) and an objective lens (Fig. 6, element 5) and on the optical path between a second light source (Fig. 6, element 1B) and the objective lens and which has a first-order diffraction efficiency of almost zero for the light beam from one of the said light sources and emits the first-order diffraction light for the light beam from the other said light source (Col. 2, lines 50-54). Katsuma further discloses that the diffraction grating has a groove depth h expressed by $h = m \cdot \lambda/(n-1)$ where n is the refractive index of said diffraction grating, λ is the wavelength of the light that is not diffracted, and m is a natural number (Col 2, lines 21-41). Katsuma teaches that a diffraction grating with a groove depth meeting the aforementioned expression will

efficiently direct light beams of different wavelengths to their corresponding optical media (Col. 1, lines 12-17).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the groove depth of each of the diffraction gratings of Toyoda in view of Ohnishi meet the diffraction grating groove depth expression of Katsuma using the wavelength of the light beam that is not diffracted ($\lambda 1$ or $\lambda 2$) as the value for λ; the motivation being to have diffraction gratings that efficiently direct light beams of different wavelengths to their corresponding optical media.

12. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Ohnishi in further view of Katsuma as applied to claim 7 above, and in further view of Shiono.

Toyoda in view of Ohnishi in further view of Katsuma discloses the optical head device as claimed in claims 7. Toyoda in view of Ohnishi in further view of Katsuma does not disclose that the natural numbers m1 and/or m2 are 1.

Shiono discloses diffraction gratings that meet the groove depth expressions of $m1 \cdot \lambda 1/(n-1)$ and $m2 \cdot \lambda 2/(n-1)$, wherein the natural numbers m1 and m2 are 1 (Col. 12, lines 61-62 and 64-65). Shiono teaches that with these groove depths, the diffraction grating will have maximum first-order diffraction efficiency for the respective wavelength (Col. 12, lines 62-64 and 65-67).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have the diffraction gratings with the groove depth expressions of Toyoda in view of Ohnishi in further view of Katsuma with the natural numbers in the expressions equal to 1 as suggested by Shiono; the motivation being for each of the

diffraction gratings to have a maximum first-order diffraction efficiency for the light of the wavelength to be diffracted.

13. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda in view of Ohnishi as applied to claim 9 above, and further in view of Ohyama (US 6,366,548).

Toyoda in view of Ohnishi does not disclose that the first diffraction grating and the second diffraction grating are formed integrally on a substrate.

Ohyama discloses a first diffraction grating and a second diffraction grating that are formed integrally on a substrate (Figs. 5A and 5B, elements 12-14).

Therefor, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the first diffraction grating and the second diffraction grating of Toyoda in view of Ohnishi integrally on a substrate as suggested by Ohyama, the motivation being to facilitate compactness by removing the need for separate substrates for each diffraction grating.

14. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Shih in view of Komma et al (US 5,687,153) (hereafter Komma).

Shih discloses the optical head device as claimed in claim 10. Shih in view of Kubo does not disclose that the nonpolarization hologram has asymmetrical or blazed gating.

Komma discloses an optical head device wherein a hologram with asymmetrical grating projects a light beam onto a recording medium and directs the reflected light from the recording medium to a photodetector (Fig. 14, elements 1, 5, and 7). The hologram has a blaze grating (Fig. 14, element 1) and Komma teaches that if the hologram is not blazed, the hologram diffracts unnecessary light on the path from a light source to the

recording medium that is reflected by the recording medium becomes noise in the servo and data signals when incident on the photodetecter (Col. 2, lines 4-19).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have blaze grating on the nonpolarization hologram of Shih as taught by Komma; the motivation being to reduce noise in the servo and data signals.

15. Claims 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shih in view of Kubo in further view of Oohchida et al (US 6,584,060) (hereafter Oohchida).

In regard to claim 13, Shih discloses the optical head device as claimed in claim 10. Shih in view of Kubo does not disclose that the nonpolarization hologram has asymmetrical stepwise gating.

Oohchida discloses an optical head device wherein a hologram projects a light beam onto a recording medium and directs the reflected light from the recording medium to a photodetector (Fig. 1A, elements 31, 51, and 103 and Figs. 10D). Oochida further discloses that the hologram has an asymmetrical stepwise grating and teaches that use of the asymmetrical stepwise grating can increase the signal to noise (S/N) ratio and reliability by detecting an intensified +1 order diffraction component of returning light (Col. 18, lines 35-53).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have asymmetrical stepwise grating on the nonpolarization hologram of Shih as taught by Oohchida; the motivation being to increase the S/N ratio and reliability.

In regard to claim 15, Shih discloses that the said recording medium includes a first disk to be read from when said first light source is used and a second disk to be read from when said second light source is used, wherein the substrate thickness of the first disk is thinner than the substrate thickness of the second disk (Col. 1, lines 43-46 and Col. 8, lines 59-64) and the distance between the optical axis of first light source (Fig. 5C, element 510b) and the optical axis of said objective lens is less than the distance between the optical axis of second light source (Fig. 5C, element 510a) and the optical axis of said objective lens (Fig. 5C and Col. 7, line 66 - Col. 8, line 4). The examiner notes that Fig. 5C and Col. 7, line 66 - Col. 8, line 4 show and describe an optical axis of the system and Fig. 2 shows the optical axis of the objective lens aligned with the described optical axis of the system.

16. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kouno in view of Nakajima.

Kouno discloses an optical head device as claimed in claim 18. Kouno does not disclose that the said first light source and second light source are a multi-wavelength semiconductor laser array.

Nakajima discloses an optical head device comprising: a first light source for emitting a light beam of a first wavelength (Fig. 8, element 21a); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 8, element 21b); and a single block wherein the first and the second light source are aligned thereon (Fig. 8, element 21). Nakajima further discloses that the first and second light sources are a multi-wavelength semiconductor laser array (Col. 7, lines 51-53) and teaches that providing the two light sources by using a multi-wavelength semiconductor laser array

will facilitate simplification of optics and stabilization of the light spot irradiation position (Col. 7, lines 56-60).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a multi-wavelength semiconductor laser array for the two light sources in the optical head device of Kuono as suggested by Nakajima; the motivation being to facilitate simplification of optics and stabilization of the light spot irradiation position.

17. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kitamura in view of Hoshino et al (US 5,243,585) (hereafter Hoshino).

Kitamura discloses an optical head device as claimed in claim 21. Kitamura does not disclose that the hologram is constructed and arranged to sense a shift in focus by a mixed aberration method.

Hoshino discloses replacing a hologram element with a multi-functional element having the function of a hologram and a converging lens that can be used sense a shift in focus using a mixed aberration method (Fig. 37, element 61; Col. 24, line 67-Col. 25, line 2; and Col. 25, lines 10-17). Hoshino teaches that the multi-functional element produces light beams with symmetric shapes when the light spot on the recording surface of the optical disc is focused that can be used to detect a focus error (Col. 25, lines 10-22).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the multi-functional element having the function of a hologram and constructed and arranged to sense a shift in focus by a mixed aberration method in the optical head device of Kitamura as taught by Hoshino, the motivation being

reduce the number of elements in the optical head device while still being able to obtain a focusing error signal.

18. Claim 33 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kouno in view of Toyoda.

In regard to claim 33, Kuono discloses a disk drive system comprising: a first light source for emitting a light beam of a first wavelength (Fig. 1, element LD1); a second light source which emits a light beam of a second wavelength differing from said first wavelength (Fig. 1, element LD2); a single block wherein the first and the second light source are aligned thereon (Fig. 1, element 102); an objective lens for causing the light beams from said first light source and second light source to converge on an optical disc (Fig. 1, element 4); a hologram for diffracting the light reflected from said optical disc and returned through said objective lens and directing the reflected light to a light-receiving element (Fig. 1, element 18); a diffraction grating which is placed on the optical path between said second light source and the hologram and which emits the 0-order and first-order diffraction light for the light beam from said second light source (Fig. 1, element 15A); and a signal processing circuit which processes the photoelectric conversion output from said light-receiving element and subjects the photoelectric conversion output of the reflected light corresponding to said first-order diffraction light to a tracking error process and obtains a signal playback output and/or a tracking error signal by phase sensing for the photoelectric conversion output of the reflected light corresponding to the 0-order diffraction light (Fig. 1, elements 32a and 32b; Col. 4, lines 7-11; and Col. 5, lines 19-24). The examiner notes that the hologram receives non-diffracted, 100% 0-order light from the light beam forwarded from the first light source and 0-order and first-order diffraction light from the

light beam forwarded from the second light source. Kuono does not disclose the that the diffraction grating is placed on the optical path between said first light source and the hologram **and** on the optical path between said second light source and the hologram and which produces almost 100% of the 0-order diffraction light for the light beam forwarded from said first light source and has a first order diffraction efficiency of almost zero **and** emits the 0-order and first-order diffraction light for the light beam from said second light source. The examiner further notes that the hologram acts as a beam splitter.

Toyoda discloses a diffraction grating (Fig. 2, element 22) that is placed on the optical path between a first light source (Fig. 2, element 21b) and a beam splitter (Fig. 2, element 23) and on the optical path between a second light source (Fig. 2, element 21a) and the beam splitter and which produces almost 100% of the 0-order diffraction light for the light beam forwarded from the first light source and has a first order diffraction efficiency of almost zero and emits the 0-order and first-order diffraction light for the light beam from the second light source (Page 4, lines 17-21 and Page 4, line 50-Page 5, line 2).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to replace the diffraction grating of Kuono with the diffraction grating of Toyoda, the motivation being to place the first and second light sources closer together and reduce the overall footprint of the disk drive system.

Allowable Subject Matter

19. Claims 27-32 are allowable over the prior art of record.

Response to Arguments

20. Applicant's arguments, see pages 12 and 14, filed December 29, 2003, with respect to claims 1-4 and 6-9 have been considered but are moot in view of the new ground(s) of rejection.

21. Applicant's arguments, see page 12, filed December 29, 2003, with respect to claims 2-3 and 5 have been considered but are moot in view of the new ground(s) of rejection.

22. Applicant's arguments filed December 29, 2003 with respect to the rejections of claims 18-19, see page 13, have been fully considered but they are not persuasive. Kouno discloses the optical head device of claims 18-19 for the reasons stated above. The examiner interprets optical axes of the beams of the first and second light sources as the axes on which the beams are emitted from their respective light source. Applicant's argument that the first and second light beams of Kouno coincide with each other is moot because claim 18 claims that the optical axis of the objective is disposed at least between the optical axes of the beams of the first and second light sources and no limitation is placed on whether or not the beams do or do not coincide with each other at any point on their optical path to or from the recording medium. The examiner interprets "at least between" as being inclusive of coincidence because claim 18 includes that the optical axis of the objective lens may be coincident with the optical axis of the beam having a shorter wavelength.

23. Applicant's arguments filed December 29, 2003 with respect to the rejection of claim 20, see page 16, have been fully considered but they are not persuasive. Kuono in

view of Nakajima discloses the optical head device of claim 20. Applicant's arguments that Kouno does not meet the limitations of claim 18 are moot for the reasons stated above.

24. Applicant's arguments filed December 29, 2003 with respect to the rejections of claims 21-22 and 25, see pages 13-14, have been fully considered but they are not persuasive.

In regard to claims 21 and 22, the examiner is unable to understand how Applicant's arguments about whether or not Kitamura shows that the distance between the first and second light sources (Figs. 16-17, element 3) and the left side detector array (Fig. 16, element 4) and between the first and second light sources (Figs. 16-17, element 3) and the right side detector array (Fig. 16, element 4) are the same have any bearing on the relationship between the center of the hologram (Fig. 16, element 6) and the midpoint between the optical axes of the first and second light sources. Fig. 17 clearly shows the first and second light sources on the integrated device (Figs. 16 and 17, element 10). The examiner interprets the midpoint between the optical axes of the first and second light sources to be the center of element 3 of Fig. 16 based on the layout shown in Fig. 17. In Fig. 16, the center of the hologram is aligned directly above the center of element 3, which is the midpoint between the optical axes of the first and second light sources. Thereby, Kitamura anticipates the limitation in question.

In regard to claim 25, Kitamura discloses that the distance between the first and second light sources and said hologram is in the range from 20 to 40 times the distance between the first and second light sources. By using Fig. 17 as a reference for the distance between the first and second light sources in Fig. 16, the distance between the first and

second light sources and said hologram appears to be in the range from 20 to 40 times the distance between the first and second light sources.

25. Applicant's arguments, see page 15, with respect to claims 10-13 and 15 have been considered but are moot in view of the new ground(s) of rejection.

26. Applicant's arguments filed December 29, 2003 with respect to the rejection of claim 24, see pages 16-17, have been fully considered but they are not persuasive. Kitamura in view of Hoshino discloses the optical head device of claim 24. Applicant's arguments that Kitamura does not meet the limitations of claim 21 are moot for the reasons stated above.

27. Applicant's arguments filed December 29, 2003 with respect to the rejection of claims 26 and 29, see pages 17, have been considered but are moot. In regard to claim 26, the arguments are moot in view of the new ground(s) of rejection. In regard to claim 29, the arguments are moot in view of the amendment to claim 29, which make claim 29 no longer dependent on claim 26.

28. Applicant's arguments, see page 17, with respect to claim 33 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

29. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael V Battaglia whose telephone number is (703) 305-4534. The examiner can normally be reached on 5-4/9 Plan with 1st Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa T Nguyen can be reached on (703) 305-9687. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Michael Battaglia

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W. R. YOUNG
PRIMARY EXAMINER